See important notes below on no separation with high performance backscatter tolling. Updated 7-30-2024

Signal Path		**Toll Transponder to Toll Reader**	**dBm**	**Toll Reader to Toll Transponder**	**dBm**	**Comments**
		< 0.00002 W ERP at 6C Tag at edge of zone	-17	<30 W ERP from Reader at antenna	<44.8	Approximate signal levels. ISO 18000-63/6C RFID protocol, one of three protocols in use to achieve national interoperability under US MAP-21 Act. Analysis similar for other US tolling protocols.
		<0.0000000004 W at reader	-64	<0.00003 W at tag at edge of zone	-15	
				ASTM Draft 6 TDMA tag sens 0.0000004 W ERP at edge of zone	-34	ASTM Draft 6 TDMA CVISIN trucking weigh station bypass and Toronto 407 toll tags.
Interference Source						
NextNav Base Station (proposed)	2000W/MHz ERP from NextNav Base Station	Base station 100m from toll site will cause signal level around 0.00013 W, six orders of magnitude greater than signal at reader. Tag signal will be blocked if reader cannot sufficiently filter signal with a few MHz separation.	-8.7	Base station 100m from toll site will cause signal level around 0.00013 W, an order of magnitude greater than 6C reader signal and three orders of magnitude greater than ASTMv6 reader signal at this same location. Potential for Base Station transmitter to blind Toll Tag.	-8.7	Downlink base station transmission may disrupt Toll Tag communications
(current)		Signal with current 30W ERP M-LMS station at same distance is approx. 0.000002 W.	-26.9	Signal with current 30W ERP M-LMS station at same distance is approx. 0.000002 W.	-26.9	
Mobile handset (proposed) using NextNav locationing service	1 W-3 W ERP from User Devices	Handset signal at 1m from tag in vehicle approx. 0.0021 W, about two orders of magnitude greater than tag signal. Tag signal will be blocked if reader cannot sufficiently filter signal with a few MHz separation.	3.2	Handset signal at 1m from tag in vehicle approx. 0.0021W, slightly more than two orders of magnitude greater than reader signal. Tag will be likely blinded due to insufficient ability to filter signal with a few MHz separation.	3.2	Handset uplink transmission may disrupt Toll Tag communications, esp at 3 Watts radiated power
(current)		Currently nearest transmission from 5G handset is approximately 50MHz away (824-849MHz).		Currently nearest transmission from 5G handset is approximately 50MHz away (824-849MHz).		

NOTES:

Darker cell shading indicates higher probability of impact

High Speed ORT Tri-Protocol operation uses the full existing 12 MHz sub-band 909.75 to 921.75 MHz for backscatter frequency multiplexing, where some readers have their passband starting at sub-band edge. Thus, there is no separation between tolling communication channels and other sub-bands. The proposed rules and NextNav Petition do not include any separation between the 5G services proposed and Tolling Backscatter.